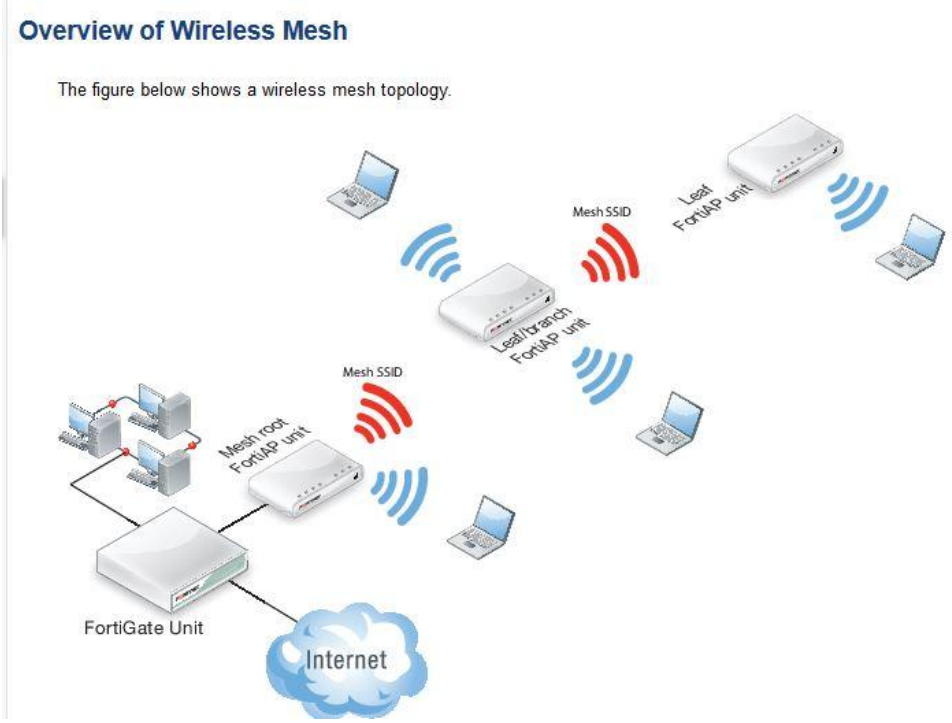
Wireless Mesh

Why Wireless mesh?

The access point of a WiFi network is usually connected to the WiFi Controller through Ethernet wiring. A wireless mesh eliminates the need for Ethernet wiring by connecting WiFi access points to the controller by ***radio***. This is useful where installation of Ethernet wiring is impractical.

Below shows a wireless mesh topology.



- The FortiAP-221B is connected to the network by Ethernet is called the Mesh Root node.
- The root node can be a FortiAP unit or built-in AP of a FortiWiFi unit.
- AP that serve only regular WiFi clients are called Leaf nodes, in this its FortiAP-220B
- Leaf AP's carry mesh SSID to other Leaf AP in the topology using a dedicated radio for eg, the 5GHz radio could carry only the mesh SSID (backhaul SSID) while the 2.4GHz radio carries one or more SSIDs that serve users.

Network:

- Network between FortiGate/FortiWiFi is 10.10.2.0/24 with dhcp enabled.
- Network for intenet users is 10.0.0.0/24 with dhcp enabled configured on WiFi controller.

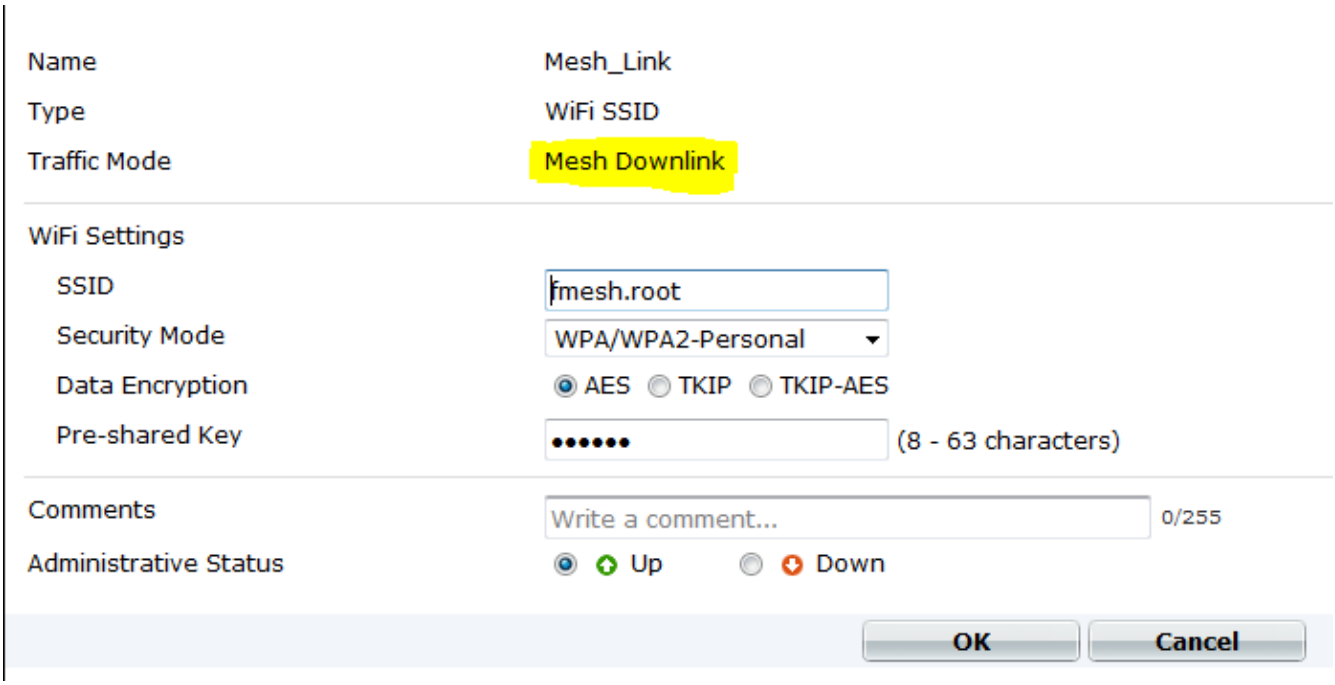
Firmware requirements:

All FortiAP units that will be part of the wireless mesh network must be runnig FAP firmware version 5.0 build 003. FortiWiFi or FortiGate unit used as the WiFi controller must be running FortiOS 5.0.

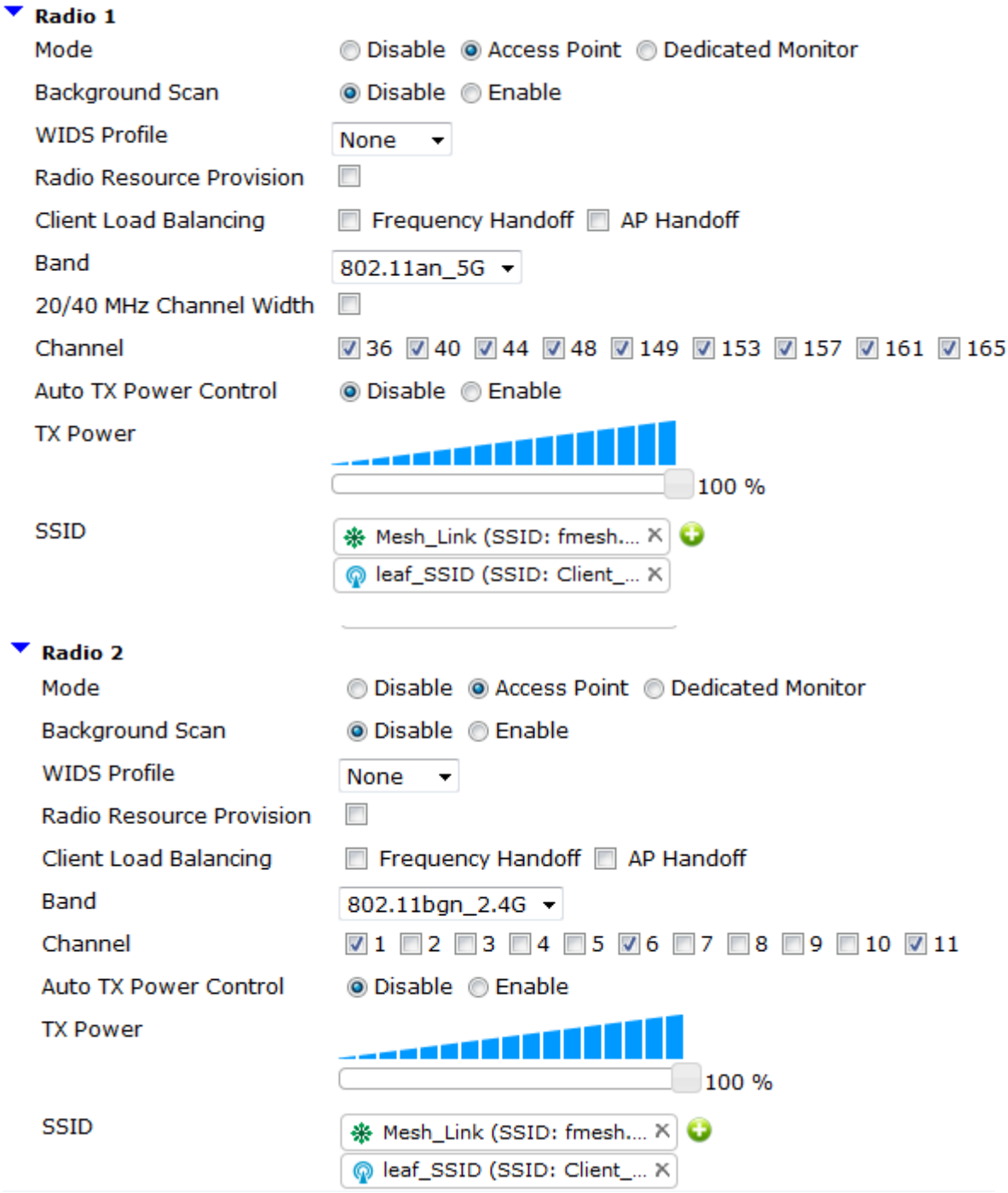
Configuration of meshed WiFi network:

Setting up Full Mesh Wireless on FortiGate Unit using two FortiAP Units.

- Configure the mesh SSID, go to WiFi Controller > WiFi Network > SSID.
- Edit the default mesh SSID fmesh.root and change the SSID from the default to something unique. Note that the traffic mode is set to ***mesh downlink***. Enter a new pre-shared key.
- Create another SSID for clients access and use tunnel



- Go to WiFi Controller > WiFi Network > Custom AP Profile and create a new AP profile, or edit the profile created earlier, and enter the follow settings: Select the correct platform, in this example we are using the FAP 221B.
- Select Radio 1 and set mode Access Point and use default Band and Channel settings. Enable your SSID and the mesh SSID from the list of available SSIDs.
- Select Radio 2 and set mode Access Point and use default Band and Channel settings.
- Enable your SSID and the mesh SSID from the list of available SSIDs. Click OK.



- If this is a new profile you will need to apply this to your custom AP profile in your managed AP. Go to WiFi Controller > Managed Access Points > Managed FortiAP and select your device and select edit. In the wireless settings change the AP profile from automatic to your new profile and select apply and ok to save your changes.
- This change will cause the access point daemons on the AP to restart.

Serial Number	FP221B3X12008432
Name	
Comments	N/A 3/35

Managed AP Status

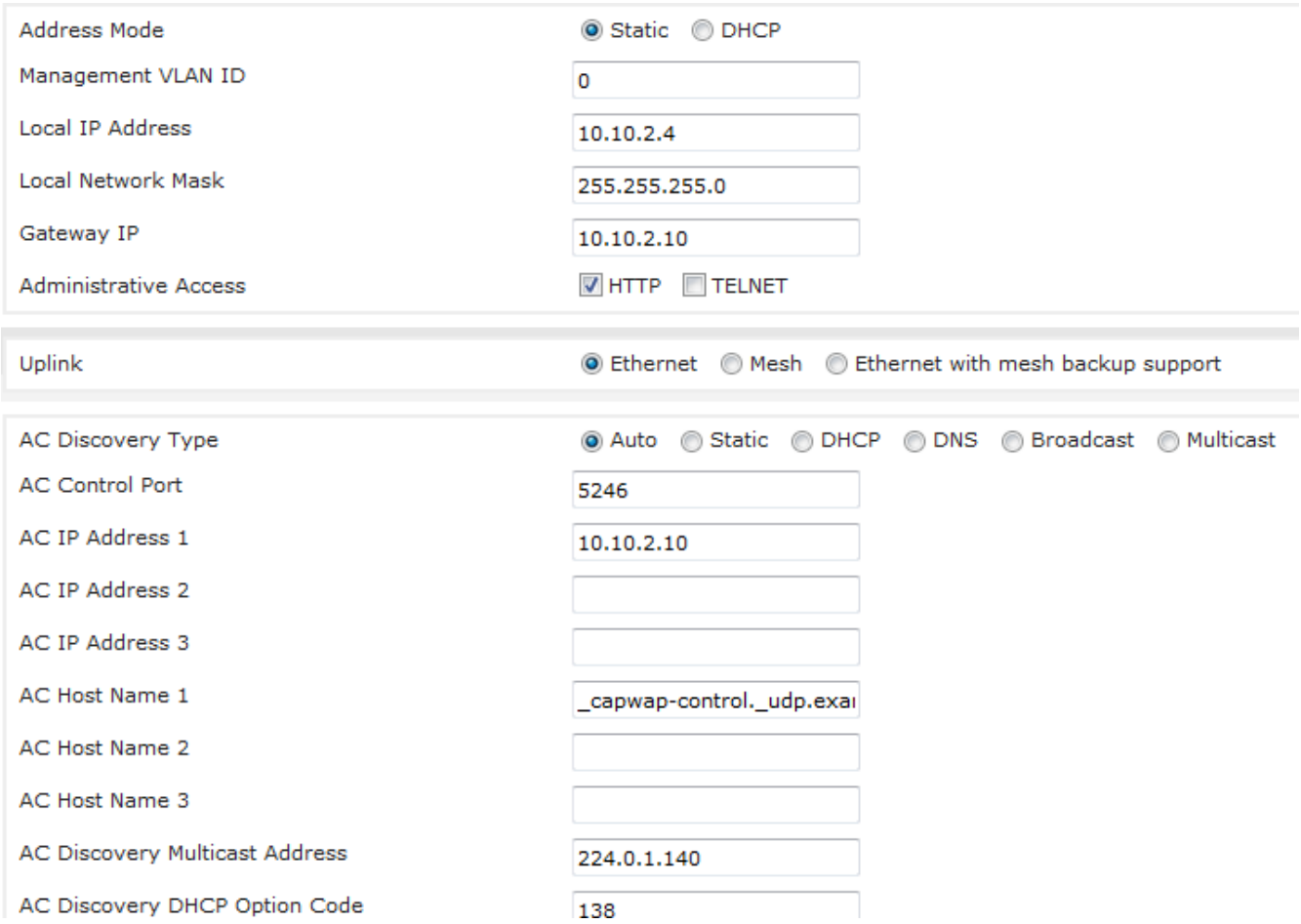
Status	Online
Connected Via	Ethernet (10.10.2.4)
Base MAC Address	00:09:0f:7c:6c:30
Join Time	11/25/14 11:00
Clients	1
FortiAP OS Version	FP221B-v5.0-build032 [A recommended update is available]
State	Authorized **Deauthorize** **Restart**

Wireless Settings

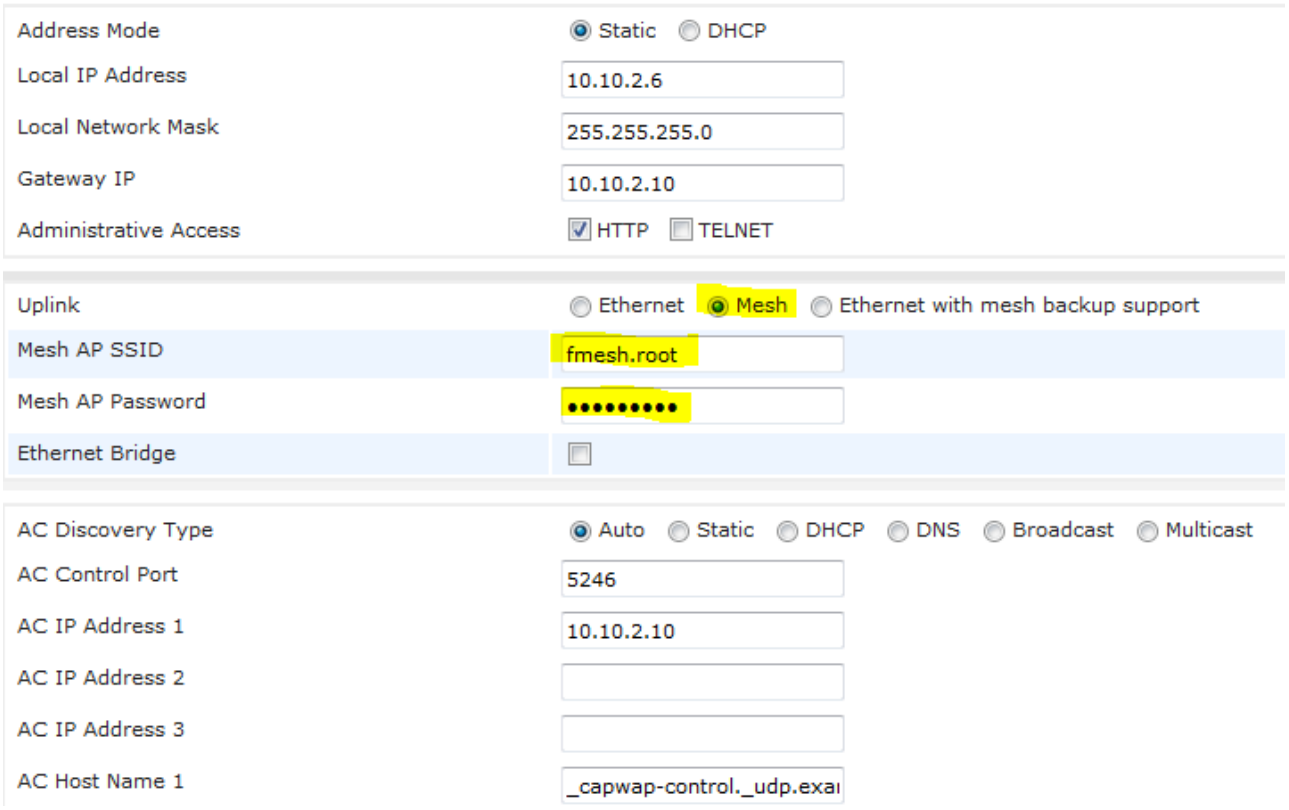
AP Profile	myap [Change]
Radio 1	
Mode	Access Point
Band	802.11an_5G
Channel	36, 40, 44, 48, 149, 153, 157, 161, 165
Radio 2	
Mode	Access Point
Band	802.11bgn_2.4G
Channel	1, 6, 11

The FortiAP units that will serve as branch/leaf nodes must be preconfigured as follows.

- Connect to the FortiAP unit web-based manager on its default Ethernet interface IP address 192.168.1.2
- In the connectivity section enter the IP address of your AP network as follows



- Start your second AP. You may need to work in pairs for this lab, in that case you have to de-authorizes one AP and then you have to authorizes the second AP The second AP will use the automatic profile which is fine for this lab.
- Configure the second AP to use the wireless mesh as an uplink. From the FortiAP GUI, go to Connectivity and select mesh and enter the mesh SSID and pre-shared key. This change will cause the access point daemons on the AP to restart.



- You should observe that the second AP connects as a leaf device.

Note: It might take some time for the state icon to become green however if you feel it is taking to long ca n you can reboot the AP to expedite the process.

Mesh	Access Point	State	Connected Via	SSIDs	Channel	Clients
	FP221B3X12008432		10.10.2.4	Radio 1: fmesh.root, Client_SSID Radio 2: fmesh.root, Client_SSID	Radio 1: 36 Radio 2: 1	Radio 1: 0 Radio 2: 1
	FAP22B3U12009906		10.10.2.6	Radio 1: All Radio 2: All	Radio 1: 149 Radio 2: 1	Radio 1: 0 Radio 2: 0

- You have now created the full mesh. If you would like to test that clients on the leaf AP can reach the wireless controller modify the AP profile associated with your root AP and remove your wireless client SSID so that it is only being announced on the leaf AP.

Debug commands:

Using the wireless controller debug of the FortiGate, try the following commands.

Use the following command to see the status of the FortiAPs:
diagnose wireless-controller wlac -c wtp

FWF60C3G12006306 # diagnose wireless-controller wlac -c wtp

```
-------------------------------WTP    1----------------------------
WTP vd              : root
vfid            : 0
    id              : FAP22B3U12009906
    mgmt_vlanid      : 0
    region code      : C
    regcode status   : invalid
    refcnt           : 3 own(1) wtpprof(1) ws(1)
    plain_ctl        : disabled
    deleted          : no
admin           : enable
    wtp-mode         : normal
    wtp-profile      : resv-dflt-FAP22B3U12009906
    name             :
    location         :
    ip-frag-prevent  : TCP_MSS
    tun-mtu          : 0,0
    active sw ver    : FAP22B-v5.0-build032
  local IPv4 addr  : 10.10.2.6
    board mac        : 00:09:0f:a1:94:3e
    join_time        : Tue Nov 25 11:01:38 2014
    mesh-uplink      : mesh
    mesh hop count   : 1
    parent wtp id    : FP221B3X12008432
    connection state : Connected
    image download progress: 0
    last failure     : 0 -- N/A
    last failure param:
    last failure time: N/A
    station info     : 0/0
    geo              : World (0)
  Radio 1            : AP
    country name     : CN
    country code     : 156
radio_type       : 11N_5G
    channel list     : 36 40 44 48 149 153 157 161 165
    darrp            : disabled
    txpower          : 100% (23 dBm)
    beacon_intv      : 100
    rts_threshold    : 2346
    frag_threshold   : 2346
```

```
    ap scan          : disable
    ap scan passive  : disabled
    sta scan         : disabled
    WIDS profile     : ---
      wlan  0        : Mesh_WiFi
      wlan  1        : leaf_SSID
    max vaps         : 8
    base bssid       : 00:09:0f:a1:94:40
    oper chan        : 149
    station info     : 0/0
  Radio 2            : AP
    country name     : CN
    country code     : 156
    radio_type       : 11N
    channel list     : 1 6 11
    darrp            : disabled
    txpower          : 100% (27 dBm)
    beacon_intv      : 100
    rts_threshold    : 2346
    frag_threshold   : 2346
    ap scan          : disable
    ap scan passive  : disabled
    sta scan         : disabled
    WIDS profile     : ---
      wlan  0        : Mesh_WiFi
      wlan  1        : leaf_SSID
    max vaps         : 8
    base bssid       : 00:09:0f:a1:94:47
    oper chan        : 1
    station info     : 0/0
  Radio 3            : Not Exist
-------------------------------WTP    2----------------------------
WTP vd               : root
    vfid             : 0
    id               : FP221B3X12008432
    mgmt_vlanid      : 0
    region code      : A
    regcode status   : valid
    refcnt           : 3 own(1) wtpprof(1) ws(1)
    plain_ctl        : disabled
    deleted          : no
    admin            : enable
    wtp-mode         : normal
    wtp-profile      : myap
    name             :
    location         : N/A
    ip-frag-prevent  : TCP_MSS
    tun-mtu          : 0,0
    active sw ver    : FP221B-v5.0-build032
    local IPv4 addr  : 10.10.2.4
  board mac          : 00:09:0f:7c:6c:30
    join_time        : Tue Nov 25 11:00:15 2014
    mesh-uplink      : ethernet
```

```
    mesh hop count   : 0
    parent wtp id    :
    connection state : Connected
    image download progress: 0
    last failure     : 10 -- JOIN REQ from unmanaged WTP is denied
    last failure param: N/A
    last failure time: Tue Nov 25 10:30:07 2014
    station info     : 1/0
    geo              : World (0)
  Radio 1            : AP
    country name     : US
    country code     : 841
    radio_type       : 11N_5G
    channel list     : 36 40 44 48 149 153 157 161 165
    darrp            : disabled
    txpower          : 100% (23 dBm)
    beacon_intv      : 100
    rts_threshold    : 2346
    frag_threshold   : 2346
    ap scan          : disable
    ap scan passive  : disabled
    sta scan         : disabled
    WIDS profile     : ---
      wlan  0        : Mesh_Link
      wlan  1        : leaf_SSID
    max vaps         : 8
    base bssid       : 00:09:0f:7c:6c:31
    oper chan        : 36
    station info     : 0/0
  Radio 2            : AP
    country name     : US
    country code     : 841
    radio_type       : 11N
    channel list     : 1 6 11
    darrp            : disabled
    txpower          : 100% (27 dBm)
    beacon_intv      : 100
    rts_threshold    : 2346
    frag_threshold   : 2346
    ap scan          : disable
    ap scan passive  : disabled
    sta scan         : disabled
    WIDS profile     : ---
      wlan  0        : Mesh_Link
      wlan  1        : leaf_SSID
   max vaps          : 8
    base bssid       : 00:09:0f:7c:6c:38
    oper chan        : 1
    station info     : 1/0
  Radio 3            : Not Exist
--------------------------------WTP    3----------------------------
WTP vd               : root
    vfid             : 0
```

```
    id              : FWF60C-WIFI0
    mgmt_vlanid     : 0
    region code     : ALL
    regcode status  : valid
    refcnt          : 3 own(1) wtpprof(1) ws(1)
    plain_ctl       : disabled
    deleted         : no
    admin           : enable
    wtp-mode        : normal
    wtp-profile     : resv-dflt-FWF60C-WIFI0
    name            :
    location        :
    ip-frag-prevent : TCP_MSS
    tun-mtu         : 0,0
    active sw ver   : FWF60C-v5.0-build292
    local IPv4 addr : 127.0.0.1
    board mac       : 00:09:0f:00:00:01
    join_time       : Mon Nov 24 12:37:52 2014
    mesh-uplink     : ethernet
    mesh hop count  : 0
    parent wtp id   :
    connection state : Connected
    image download progress: 0
  last failure      : 0 -- N/A
    last failure param:
    last failure time: N/A
    station info    : 0/0
    geo             : World (0)
  Radio 1           : AP
    country name    : US
    country code    : N/A
    radio_type      : 11N
channel list        : 1 6 11
    darrp           : disabled
    txpower         : 100% (27 dBm)
    beacon_intv     : 100
    rts_threshold   : 2346
    frag_threshold  : 2346
    ap scan         : disable
    ap scan passive : disabled
    sta scan        : disabled
    WIDS profile    : ---
    max vaps        : 8
    base bssid      : 00:0e:8e:41:2e:69
    oper chan       : 1
    station info    : 0/0
  Radio 2           : Not Exist
  Radio 3           : Not Exist
--------------------------------Total    3 WTPs----------------------------
```

Use the following command to list the configured wireless LANs:
diagnose wireless-controller wlac -c wlan

FWF60C3G12006306 # diagnose wireless-controller wlac -c wlan

WLAN (001/003) vdom,name: root, Mesh_Link
vlanid : 0 (auto vlan intf disabled)
sw name :
ip, mac : 0.0.0.0, 00:ff:b1:aa:12:39
status : up
refcnt, deleted : 3 own(1) wtpprof(2)
mesh backhaul : enabled
local bridging : disabled
local switching : disabled
dynamic vlan : disabled
auth type : 0
mac type : 0xffffffff
tunnel type : 0xffffffff
fast roaming : 0x1
bc suppression : dhcp arp
suppress ssid : 0
ssid : fmesh.root
security : 7
radius mac auth : disabled
radius mac auth svr:
auth : 0
key :
keyindex : 1
password : fmeshroot
radius_server :
usergroup : 0
intra privacy : disabled
station info : 1/0
kern sock : 23
mf acl cfg : disabled, allow, 0 entries
sta list 0000 72:09:0f:a1:94:47 ws (0-10.10.2.4:5246) 1 0
WTP 0001 : 0, FP221B3X12008432
---- 0-10.10.2.4:5246 (12 - CWAS_RUN)

WLAN (002/003) vdom,name: root, Mesh_WiFi
vlanid : 0 (auto vlan intf disabled)
sw name :
ip, mac : 10.0.0.1, 00:ff:d7:12:eb:8f
status : down
refcnt, deleted : 3 own(1) wtpprof(2)
mesh backhaul : disabled
local bridging : disabled
local switching : enabled
dynamic vlan : disabled
auth type : 0
mac type : 0xffffffff
tunnel type : 0xffffffff

```
    fast roaming       : 0x1
    bc suppression     : dhcp arp
    suppress ssid      : 0
    ssid               : fortinet.mesh.root
    security           : 7
    radius mac auth    : disabled
    radius mac auth svr:
    auth               : 0
    key                :
    keyindex           : 1
    password           : fortinet
    radius_server      :
usergroup          : 0
    intra privacy      : disabled
    station info       : 0/0
    kern sock          : 8
    mf acl cfg         : disabled, allow, 0 entries
  WTP 0002             : 0, FAP22B3U12009906
     ---- 0-10.10.2.6:5246 (12 - CWAS_RUN)

WLAN (003/003) vdom,name: root, leaf_SSID
    vlanid             : 0 (auto vlan intf disabled)
    sw name            :
    ip, mac            : 10.0.0.1, 00:ff:50:2f:de:4e
    status             : up
    refcnt, deleted    : 5  own(1) wtpprof(4)
    mesh backhaul      : disabled
    local bridging     : disabled
    local switching    : enabled
    dynamic vlan       : disabled
    auth type          : 0
    mac type           : 0xffffffff
    tunnel type        : 0xffffffff
    fast roaming       : 0x1
    bc suppression     : dhcp arp
    suppress ssid      : 0
    ssid               : Client_SSID
    security           : 7
    radius mac auth    : disabled
    radius mac auth svr:
    auth               : 0
    key                :
    keyindex           : 1
    password           : fmeshroot
    radius_server      :
    usergroup          : 0
    intra privacy      : disabled
    station info       : 0/0
    kern sock          : 24
    mf acl cfg         : disabled, allow, 0 entries
  WTP 0003             : 0, FAP22B3U12009906
     ---- 0-10.10.2.6:5246 (12 - CWAS_RUN)
  WTP 0004             : 0, FP221B3X12008432
```

---- 0-10.10.2.4:5246 (12 - CWAS_RUN)

Use the following command to list the connected wireless stations:
diagnose wireless-controller wlac -d sta

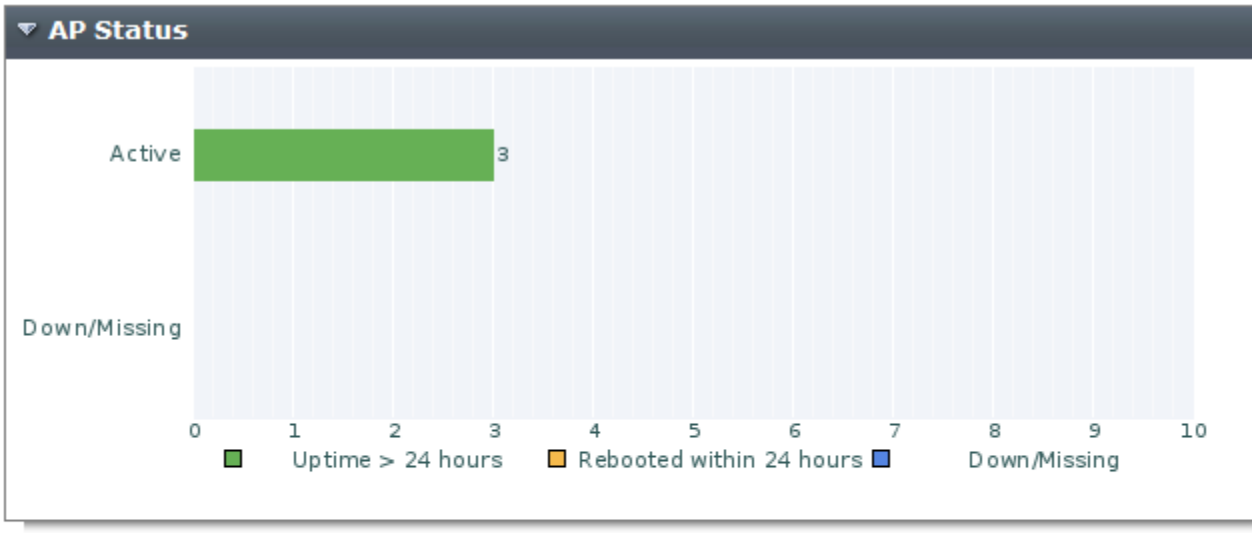
FWF60C3G12006306 # diagnose wireless-controller wlac -d sta

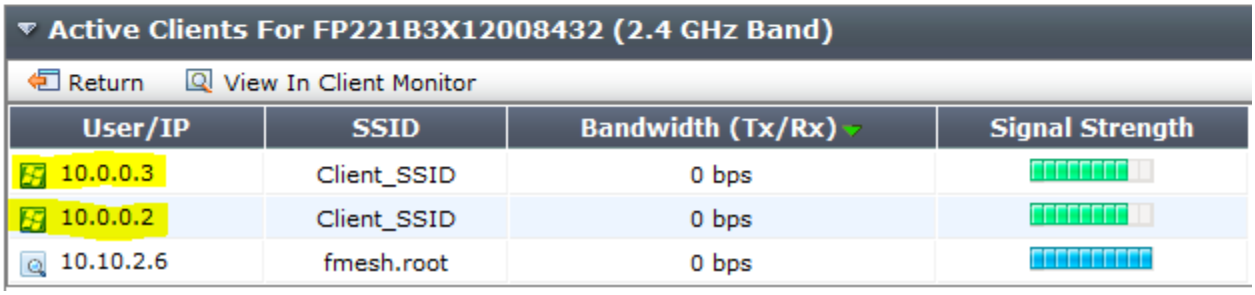
* vf=0 wtp=15 rId=1 wlan=leaf_SSID ip=0.0.0.0 mac=12:09:0f:7c:6c:31 vci= host= user= group= signal=0 noise=0 idle=23145 bw=0 use=3 chan=36 radio_type=11N_5G security=wpa_wpa2_personal encrypt=aes online=yes
* vf=0 wtp=15 rId=2 wlan=leaf_SSID ip=0.0.0.0 mac=12:09:0f:7c:6c:38 vci= host= user= group= signal=0 noise=0 idle=23145 bw=0 use=3 chan=1 radio_type=11N security=wpa_wpa2_personal encrypt=aes online=yes
vf=0 wtp=15 rId=2 wlan=leaf_SSID ip=10.0.0.3 mac=00:26:c7:99:33:86 vci=MSFT 5.0 host=Yogesh-PC user= group= signal=-43 noise=-95 idle=1 bw=0 use=3 chan=1 radio_type=11N security=wpa2_only_personal encrypt=aes online=yes
* vf=0 wtp=16 rId=2 wlan=leaf_SSID ip=0.0.0.0 mac=12:09:0f:a1:94:47 vci= host= user= group= signal=0 noise=0 idle=23061 bw=0 use=3 chan=1 radio_type=11N security=wpa_wpa2_personal encrypt=aes online=yes
* vf=0 wtp=16 rId=1 wlan=leaf_SSID ip=0.0.0.0 mac=12:09:0f:a1:94:40 vci= host= user= group= signal=0 noise=0 idle=23062 bw=0 use=3 chan=149 radio_type=11N_5G security=wpa_wpa2_personal encrypt=aes online=yes
vf=0 wtp=15 rId=2 wlan=leaf_SSID ip=10.0.0.2 mac=90:21:55:eb:bf:25 vci= host= user= group= signal=-44 noise=-95 idle=27 bw=0 use=3 chan=1 radio_type=11N security=wpa2_only_personal encrypt=aes online=yes
* vf=0 wtp=15 rId=1 wlan=Mesh_Link ip=0.0.0.0 mac=00:09:0f:7c:6c:31 vci= host= user= group= signal=0 noise=0 idle=22187 bw=0 use=3 chan=36 radio_type=11N_5G security=wpa_wpa2_personal encrypt=aes online=yes
* vf=0 wtp=15 rId=2 wlan=Mesh_Link ip=0.0.0.0 mac=00:09:0f:7c:6c:38 vci= host= user= group= signal=0 noise=0 idle=22187 bw=0 use=3 chan=1 radio_type=11N security=wpa_wpa2_personal encrypt=aes online=yes
m vf=0 wtp=15 rId=2 wlan=Mesh_Link ip=10.10.2.6 mac=72:09:0f:a1:94:47 vci= host= user= group= signal=-28 noise=-95 idle=3 bw=0 use=3 chan=1 radio_type=11N security=wpa2_only_personal encrypt=aes online=yes
* vf=0 wtp=16 rId=2 wlan=Mesh_WiFi ip=0.0.0.0 mac=00:09:0f:a1:94:47 vci= host= user= group= signal=0 noise=0 idle=23062 bw=0 use=3 chan=1 radio_type=11N security=wpa_wpa2_personal encrypt=aes online=yes
* vf=0 wtp=16 rId=1 wlan=Mesh_WiFi ip=0.0.0.0 mac=00:09:0f:a1:94:40 vci= host= user= group= signal=0 noise=0 idle=23062 bw=0 use=3 chan=149 radio_type=11N_5G security=wpa_wpa2_personal encrypt=aes online=yes

Using the debug of the FortiAP, try the following commands.

View the status of the Wireless clients:

Go to WiFi Controller > Monitors > Wireless Health to view the list of all connected internet users.





In the FortiAP CLI, you can check the ***main ip*** field in the output from the commands

cw_diag -c mesh

FAP22B3U12009906 # cw_diag -c mesh

Sys Cfg AP addr mode: static
stp mode : 0
dflt ip : 10.10.2.6
dflt mask: 255.255.255.0
dflt gw : 10.10.2.10

Mesh Cfg Uplink : Mesh Uplink
AP SSID : fmesh.root
AP BSSID : 00:00:00:00:00:00

AP PASSWD : fmeshroot
local eth bridge : 2

Mesh Oper AP Type : Mesh Uplink
wbh status : running
wbh rId : 1
wbh mac : 72:09:0f:a1:94:47
wbh bssid : 00:09:0f:7c:6c:38
wbh Chan : 1
vap mhc : 1
eth type : 0x2233

main dhcp ip : 0.0.0.0
main dhcp mask : 0.0.0.0
main dhcp gw : 0.0.0.0

bh dhcp ip : 0.0.0.0
bh dhcp mask : 0.0.0.0
bh dhcp gw : 0.0.0.0

main ip : 10.10.2.6
main mask : 255.255.255.0
main gw : 10.10.2.10

bh ip : 0.0.0.0
bh mask : 0.0.0.0
bh gw : 0.0.0.0
bh mac : 00:00:00:00:00:00

eth bridge : 2

Troubleshooting Guide of Wireless Mesh:

Use the following command to list the Authentication process and client connection:

diagnose debug application wpad 4
diagnose debug enable

```
     2E 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ...............
     00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ...............
     00 D4 C3 87 7E EF 0D 1A A1 12 4C 39 2B 5D 63 47   ....~.....L9+]cG
     7B 00 16 30 14 01 00 00 0F AC 04 01 00 00 0F AC   {..0............
     04 01 00 00 0F AC 02 0C 00                        .........
46580.212 90:21:55:eb:bf:25 <eh> IEEE 802.1X (EAPOL 121B) <== 90:21:55:eb:bf:25 w
s (0-10.10.2.4:5246) rId 1 wId 1 12:09:0f:7c:6c:38
85120.213 IEEE 802.1X: 121 bytes from 90:21:55:eb:bf:25
85120.216    IEEE 802.1X: version=1 type=3 length=117
46580.219 90:21:55:eb:bf:25 <eh>     recv IEEE 802.1X ver=1 type=3 (EAPOL_KEY) da
ta len=117
46580.221 90:21:55:eb:bf:25 <eh>     recv EAPOL-Key 2/4 Pairwise replay cnt 1
85120.223 : STA 90:21:55:eb:bf:25 WPA: received EAPOL-Key frame (2/4 Pairwise)
85120.225 WPA: 90:21:55:eb:bf:25 WPA_PTK entering state PTKCALCNEGOTIATING
85120.226 PMK - hexdump(len=32):
     A0 E4 AA 7B 42 D7 AA 71 0A 15 63 00 1D 8E 5B 17   ...{B..q..c...[.
     E7 52 AB 1F E3 B4 51 CF ED DB 8A E5 BC 24 34 99   .R....Q......$4.
85120.228 PTK - hexdump(len=64):
     82 A7 A2 8C 6B 2C 6A E9 F7 06 E4 3B F2 FF 60 12   ....k,j....;..`.
     CA F3 E2 4D A9 CF BF 04 49 7B 86 F1 D7 E3 E1 7B   ...M....I{.....{
     32 A6 E5 44 8F B0 D4 F0 50 B3 18 EA F1 8D 5A 7A   2..D....P.....Zz
     79 39 9C 6A C0 33 17 C9 74 9B 7F EB 74 95 2E 4D   y9.j.3..t...t..M
85120.231 WPA: 90:21:55:eb:bf:25 WPA_PTK entering state PTKCALCNEGOTIATING2
85120.232 WPA: 90:21:55:eb:bf:25 WPA_PTK entering state PTKGETRSC
85120.233 WPA: 90:21:55:eb:bf:25 WPA_PTK entering state PTKINITNEGOTIATING
85120.235 : STA 90:21:55:eb:bf:25 WPA: sending 3/4 msg of 4-Way Handshake
46580.239 90:21:55:eb:bf:25 <eh>     send 3/4 msg of 4-Way Handshake
85120.241 Plaintext EAPOL-Key Key Data - hexdump(len=80):
     30 14 01 00 00 0F AC 04 01 00 00 0F AC 04 01 00   0...............
     00 0F AC 02 01 00 DD 16 00 50 F2 01 01 00 00 50   .........P.....P
     F2 04 01 00 00 50 F2 04 01 00 00 50 F2 02 DD 16   .....P.....P....
     00 0F AC 01 02 00 EC 94 88 1E 02 4F F7 E7 A8 9F   ...........O....
     99 F2 43 A2 4A 2F DD 00 00 00 00 00 00 00 00 00   ..C.J/..........
46580.246 90:21:55:eb:bf:25 <eh>     send IEEE 802.1X ver=1 type=3 (EAPOL_KEY) da
ta len=175 replay cnt 2
46580.247 90:21:55:eb:bf:25 <eh> IEEE 802.1X (EAPOL 179B) ==> 90:21:55:eb:bf:25 w
s (0-10.10.2.4:5246) rId 1 wId 1 12:09:0f:7c:6c:38
```

Use the following command to list specific client process by filtering it with mac-address:

diagnose wireless-controller wlac sta_filter <client-mac> 1
diagnose debug enable

To turn it off use following commands:

diagnose wireless-controller wlac sta_filter <client-mac> 0
diagnose debug reset

```
FWF60C3G12006306 # diagnose wireless-controller wlac sta_filter 00:26:c7:99:33:
 1

STA Filter Index 0/1    sta 00:26:c7:99:33:86    log-enabled 1

FWF60C3G12006306 # diagnose debug en

FWF60C3G12006306 # 05177.312 hostapd_query_capwap_pid cw_acd pid 94 unacked que
 count:1
05177.314 Sending data - hexdump(len=102):
     0A 03 00 00 01 00 00 00 00 00 00 00 00 00 00 00   ................
     00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
     00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
     00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
     00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
     00 00 00 00 00 00 00 00 00 00 00 00 00 00 04 00   ................
     00 00 5F 00 00 00                                 .._...
05177.318 HOSTAPD: 0.0.0.0:0<0-0> sent E2C_QUERY_PID (102 bytes)
05177.319 HOSTAPD: 0.0.0.0:0<0-0> Received C2E_SEND_PID (4 bytes)
05177.320 Received data - hexdump(len=102):
     11 02 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
     00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
     00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
     00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
     00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
     00 00 00 00 00 00 00 00 00 00 00 00 00 00 04 00   ................
     00 00 5E 00 00 00                                 ..^...
05177.325 Get AC daemon pid 94
05187.332 hostapd_query_capwap_pid cw_acd pid 94 unacked query count:1
05187.334 Sending data - hexdump(len=102):
     0A 03 00 00 01 00 00 00 00 00 00 00 00 00 00 00   ................
     00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
     00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
     00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
     00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00   ................
     00 00 00 00 00 00 00 00 00 00 00 00 00 00 04 00   ................
     00 00 5F 00 00 00                                 .._...
05187.338 HOSTAPD: 0.0.0.0:0<0-0> sent E2C_QUERY_PID (102 bytes)
```

IMP: For specific mac-address filtering you have to use the same debug commands with grep and the name of the mac-address